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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,499	08/30/2001	Salman Akram	3936.1US (99-0066.1)	4371
24247	7590	10/15/2003	EXAMINER	
CHAMBLISS, ALONZO				
ART UNIT			PAPER NUMBER	
2827				

DATE MAILED: 10/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/944,499

Applicant(s)

AKRAM ET AL.

Examiner

Alonzo Chambliss

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) 4,6 and 32 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5 and 7-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsman's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☒ Other: _____

DETAILED ACTION

1. Applicant's request for reconsideration of the finality of the rejection of the last Office action is persuasive and, therefore, the finality of that action is withdrawn. Therefore, this action is made non-final.

2. Amendment filed on 9/22/03 has been fully considered and made of record in Paper No. 15.

Response to Arguments

3. Applicant's arguments with respect to claims 1-3, 5, and 7-31 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 2 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. In claim 2, the phrase " in contact with at least one of said contact pads will extend beyond said surface " is vague and indefinite since the language is confusing and it is not clear what applicant is making claim for.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 5, 7-11, 13-22, 24, 25, and 27-31, insofar as definite, are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Kikuchi et al. (JP 11-40608).

With respect to Claims 1, 9, 13, 16, 20, 25, 29, and 31, Kikuchi teaches a substrate 2 having a surface with contact pads 2b exposed thereto, wherein the contact pads 2b being configured to be connected with conductors 5a on a surface of another semiconductor device component 5. Each contact 5a of the semiconductor device component 5 being arranged substantially in-line with a plurality of other contact pads 5a and positioned proximate (i.e. close to or in the vicinity) to a centerline of the substrate 2. At least one nonconductive stabilizer 6 (i.e. epoxy resin) and adhesive protruding from the surface and positioned between a periphery of the surface and each contact pad2b exposed to the surface and including a plurality of at least partially superimposed, contiguous, mutually adhered layers of dielectric material. The stabilizer has an elongate element which extends in a direction parallel to the surface of the substrate 2. The adhesive serves as one dielectric layer and the epoxy resin serves as the second layer of dielectric material (see English translation, paragraphs 26, 41, 60, 86, and 87; Figs. 3a-3c, and 4-6).

With respect to Claims 2, 14, 15, 21, and 27, Kikuchi teaches wherein the at least one stabilizer 6 protrudes from the surface a distance no more than a distance that at least one conductive structure 4 to be disposed in contact with at least one of the contact pads 2b that extends beyond the surface while permitting the conductive structures 4 on the contact pads 2b to contact the conductors 5a of the other semiconductor device component 5 (see paragraph 26; Fig. 3a-3c).

With respect to Claims 3 and 28, Kikuchi teaches wherein the at least one stabilizer 6 protrudes from the active surface a distance that permits conductive structures 4 on the contact pads 2b to contact the conductors 5a of the semiconductor device 5 (see Fig. 3a).

With respect to Claims 4, 5, 17, and 30, Kikuchi teaches wherein the at least one stabilizer 6 comprises an epoxy resin (see paragraph 87). It is inherent in the composition of epoxy resin that it is photo curable.

With respect to Claims 7 and 18, Kikuchi teaches wherein the at least one stabilizer 6 is positioned proximate a corner of the active surface 2a (see Fig. 4).

With respect to Claims 8 and 19, Kikuchi teaches wherein the at least one stabilizer 6 has a cross-sectional quadrilateral shape (see Figs. 4 and 5).

With respect to Claim 10, Kikuchi teaches further comprising protruding conductive structures 4 in contact with selected ones of the contact pads 5a (see Fig. 3a-3c).

With respect to Claims 11 and 22, Kikuchi teaches wherein the conductive structures 4 comprise of solder bumps (see Figs. 3a-3c and 4-6).

With respect to Claim 24, Kukuchi teaches wherein the at least one stabilizer 6 maintains a substantially uniform distance between the surface of the substrate 2 and the surface of the other semiconductor device component 5 (see paragraphs 64-74; Figs. 3a-3c).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 12 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kukuchi et al. (JP 11-40608) as applied to claims 1 and 13 above, and further in view of Sato (U.S. 6,287,895).

With respect to Claims 12 and 23, it is well known in the semiconductor industry

that a substrate comprises a semiconductor wafer with a plurality of dices thereon as evident by Sato (see col. 5 lines 16-39; Figs. 5, 6A, and 6B). Therefore, it would have been obvious to have substrate with a semiconductor wafer having a plurality of dices thereon with the device of Kukuchi, since substrate would allow several devices to be created simultaneously which reduces the production time of the devices as taught by Sato.

11. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kukuchi et al. (JP 11-40608) as applied to claims 1 and 13 above, and further in view of Kuniaki et al. (JP 10-189653).

With respect to Claim 26, Kukuchi fails to disclose wherein the at least one stabilizer is configured so that voids do not occur in an insulative underfill material when the insulative underfill material is flowed into a space created when the substrate is connected with the other semiconductor device component. However, Kuniaki discloses wherein the at least one stabilizer 12 is configured so that voids do not occur in the insulative underfill material 15 when the insulative underfill material 15 is flowed into the space created when the substrate 2 is connected with the semiconductor device 3, since if voids were present in the insulative underfill material 15, the underfill material would not reinforce the solder connection (see English translation, paragraph 24, Fig. 14). Therefore, it would have been obvious to incorporate stabilizers to prevent voids in an underfill with the device of Kukuchi, since the stabilizers allow the underfill material to reinforce the solder connection which improves the stability of the semiconductor package as taught by Kuniaki.

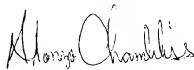
The prior art made of record and not relied upon is cited primarily to show the product of the instant invention.

Conclusion

12. Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956

AC/October 2, 2003



Alonzo Chambliss
Patent Examiner
Art Unit 2827